Matter-Wave Experiment Helps to Detect Matter in Space | A Substitute for Michelson-Morley's Experiment

Joseph George

(Researcher & Author)

The null result from Michelson-Morley's experiment has an important role in the development of the Theory of Relativity. In fact, this was one of the inspirations for Einstein to work on his theories. The experiment was intended to detect the existence of a state of matter in space but failed. Einstein proposed a model of the Universe which does not require the above-stated matter. Today the Theory of Relativity is considered one of the greatest achievements in physics which is widely used as a tool to study and explore the Universe. It deals with space, time, matter, energy, etc. Researchers around the world are busy with finding relativistic explanations for all phenomena in the macroscopic Universe and also to unify Relativity and Quantum mechanics (which deals with the behavior of atoms and subatomic particles). At the same time, however, if somebody comes forward with a novel technique to detect matter-in-space and experimentally prove its existence, it will be disastrous to Relativity too. I think that there is an issue with Michelson-Morley's experiment. If space is filled with the above-stated matter and if because of gravity a massive body maintains a denser region of that matter around the body (watch my previous videos: Starlight bending, Precession of Mercury’s orbit, etc) the two perpendicular laser beams in the interferometer would be traveling through a “stationary space" and it may not create interference and the experiment would give a null result. In fact, I think that we need to search for other ways to probe matter-in-space if such a matter exists. It has been already confirmed that a body's mass can increase with its speed, its length can contract in the direction of its motion, a clock ticks faster in

a weak gravitational field, etc. According to Einstein, these are relativistic effects and Relativity gives explanations for such phenomena. Interestingly, however, these phenomena can also be explained in a non-relativistic way just by adding a matter-in-space in the picture. In 1924, de Broglie introduced the matter-wave hypothesis, suggesting that particles like electrons must also have a wave-like behavior. In 1927, at the University of Aberdeen, G. P. Thomson passed a beam of electrons through a thin metal film and observed interference patterns created by the electrons. At the same period of time, at Bell Labs, Davisson and Germer conducted an experiment by guiding an electron beam through a crystalline grid and obtained similar patterns. The two experiments demonstrated that moving electrons can act as a wave as suggested by de Broglie and this led to the development of a new branch in physics, Quantum mechanics. Quantum mechanics is considered as another giant leap in science alongside Relativity today. However, I have a different thought about matter-wave experiments. In the Davisson-Germer experiment, the maximum intensity of electrons diffracted by the atomic surface was observed at an angle $\theta = 50°$ with a voltage of 54V. Here the question is how is it possible for an electron to completely change its behavior by increasing its kinetic energy just by 54 electron volts (in fact, electrons can demonstrate this behavior even at lower voltages). In comparison, X-Ray tubes start to work in kilovolts. Industrial X-ray machines operate at hundreds of kilovolts, which means electrons collide on the target of these machines at very high energies. But before or after these collisions, electrons remain very much the same. In short, there is no reason to think that the properties of an electron (or other subatomic particles) would change because of some 54 electron volts of energy. Therefore I think that perhaps there is something interesting happening here. When electrons are accelerated, perhaps they are constantly colliding with matter-in-space (or particles in space) and their path becomes chaotic. Because of this, no particle

could travel in a straight line through space. If we apply this idea to the matter-wave equation we will get the exact same result that we see in de Broglie's matter-wave hypothesis. Before we talked about the possibility that perhaps a massive body maintains a denser region of matter-in-space around the body and its density may be greater near the body and it decreases with increasing distance from the body. If this is the case, because of the density differences, two matter-wave experiments conducted one on Earth and one in outer space may produce two slightly different interference patterns. Satellites in the GPS constellation orbits at an altitude of about 20,000 km from the ground and it is known today that the occurrence of the time dilation in the atomic clocks of GPS systems. I think that perhaps we can verify the presence of matter-in-space by comparing an Earth-based and a satellite-based matter-wave experiment. Perhaps such an experiment will revolutionize our understanding of the Universe forever. I welcome researchers to consider exploring the Universe in a new way.

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